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ABSTRACT

The purpose of this paper is to review and summarize empirical evidence on the effects of different kinds of scheduling on kindergarten children. A search was made for all research conducted within the last 10 years that directly compared kindergarten children in different programs on academic readiness for first grade and on socioemotional development. Eight studies comparing student outcomes in half-day, everyday (HDED) and full-day, alternate day (FDAD) schedules were located and reviewed. Sample sizes ranged from adequate to large; to control for teacher effects, each study included more than one teacher in each of the schedules compared. While aggregate findings revealed no differences in socioemotional adjustment and neither schedule was revealed as clearly superior, results did indicate a slight edge favoring FDAD in academic achievement. Eight studies were also located that compared students in HDED and full-day, everyday (FDED) schedules. The evidence strongly supported the academic advantages of the FDED schedule. Tables providing background information and summaries of results for the two sets of studies are appended. (Author/RH)

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SYNOPSIS OF RESEARCH ON KINDERGARTEN SCHEDULING: HALF-DAY, EVERYDAY; FULL DAY, ALTERNATE DAY; AND FULL DAY, EVERYDAY

Eight studies comparing student outcomes in half-day, everyday and full day, alternate day schedules were located and reviewed. The aggregated findings revealed no differences in socioemotional adjustment. The results indicated a slight edge favoring full day, alternate day in academic achievement, but neither schedule was clearly superior. Eight studies were also located which compared students in half-day, everyday and full day, everyday schedules. The evidence strongly supported the academic advantages of the full day, everyday schedule.

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With rising costs and decreasing revenues, schools across the nation have been forced to trim their budgets. One economizing measure in rural areas has been the modification of the kindergarten attendance schedule to reduce transportation costs. The most common U. S. pattern is the half-day, everyday schedule in which children attend either morning or afternoon sessions of two to three hours, five days a week. In rural areas, this schedule requires midday busing. Typically children who attend morning kindergarten ride the regular bus to class and return on the special midday bus. Kindergarteners in afternoon sessions are picked up on the midday bus and return via the regular bus. By reorganizing the half-day, everyday pattern to some type of full day schedule, the need for midday busing is eliminated. With the rising cost of transportation, such savings can be substantial.

A look at the trends in Iowa kindergarten patterns indicates a strong interest in alternatives to the half-day, everyday (HDED) schedule. Figure 1 illustrates this trend for districts who use the same schedule for both semesters of kindergarten. Since 1975, the number of districts using HDED has declined by 35 percent; 74 percent of the decline has occurred within the last two years. The most frequent alternatives in Iowa have been the full day, everyday schedule (FDED), approximately six hours per day, five days per week and the full day, alternative day schedule (FDAD), in which children typically attend all day on Monday, Wednesday, and Friday of one week and Tuesday and Thursday of the next week. In 1981-82, 47 percent of the Iowa districts used HDED, 22 percent used FDAD, and 20 percent used FDED.

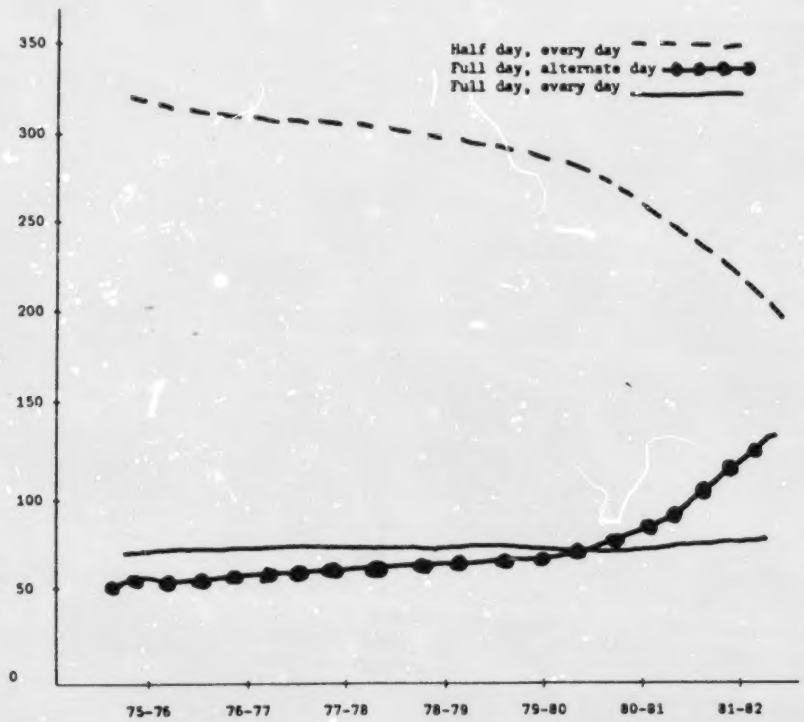

FIGURE 1. LONGITUDINAL TRENDS FOR KINDERGARTEN SCHEDULING (From Iowa Department of Public Instruction; full day alternate day figures include full day, three-days-per-week schedule)

The advantages and disadvantages of these three schedules have been widely, sometimes heatedly, discussed in Iowa and across the nation. The debate has focused on two general areas--finances and effects on children. The costs of midday busing and half-time versus full-time teaching salaries can be fairly easily documented. However, much of the evidence on effects of scheduling on children is based on personal experience and speculation. A number of parents and educators question the physical and mental stamina of four- and five-year olds to participate effectively in a full day of school seen in the FDED and FDAD schedules. Many express concerns that the lack of daily contact in FDAD might jeopardize learning and socialization.

The purpose of this paper is to review and summarize the empirical evidence on the effects of scheduling on kindergarteners. A thorough search was made for all research which directly compared students on academic readiness for first grade and socioemotional development. Studies which compared parent and teacher attitudes were excluded. Attitudes and preferences are important, but they are sensitive to a variety of pressures and do not generalize well from one school to another. Also excluded were studies which focused only on disadvantaged or lower achieving children, because the predominate questions on scheduling concern heterogeneous groups of children. The intent of the review is to present the evidence, in capsule form, to those who are facing decisions on scheduling. Details of each study are available from the references cited at the end of the review.

The research is reviewed in two parts--HDED versus FDAD and HDED versus FDED--and concludes with a section on implications. All of the studies were conducted within the last ten years. The sample sizes ranged from adequate to large, and each study included more than one teacher in each schedule to control for teacher effects. The manner in which districts and classrooms were selected was not well described. None employed strictly random procedures, but each study attempted to match schedule groups on some relevant characteristics (for example, sex of the children, district size, teacher experience, class size, and/or socioeconomic status).

PART 1: HALF-DAY, EVERYDAY (HDED) VERSUS FULL DAY, ALTERNATE DAY (FDAD)

Eight studies were located which directly compared students in HDED with students in FDAD. Seven of these studies are reviewed in an excellent paper by Moncada (1980). Table 1 (see appendix) presents background information on the studies. Nearly all of the children were located in rural areas in the Midwest. The FDAD schedule was used for the full school year except the Ulrey research, which used FDAD for only one semester. Testing was done toward the end of the kindergarten year in six studies; Wenger tested at the beginning of first grade; and the follow-up testing by C. Smith was conducted early in fourth grade.

When the results are reviewed study by study, the overall picture is quite ambiguous. The findings are inconsistent within the across studies making it difficult to draw conclusions. Rather than try to aggregate study results, the approach used in this review was to aggregate comparison results. Most of the studies compared the students on several subtests, thus yielding more than one comparison per study. A talley was made of the number of comparisons which statistically favored HDED and FDAD*. Table 2 (see appendix) lists the results for comparisons of academic achievement.

Because the Metropolitan Reading Test was the most frequently used test, it is briefly described here. This standardized battery assesses a wide range of readiness skills needed in first grade reading and math. Two editions were used--the subtests are outlined below:

Metropolitan Readiness Test, 1965 Edition

1. Word Meaning - picture vocabulary.
2. Listening - comprehension of phrases and sentences.
3. Matching - visual recognition of similarities.
4. Alphabet - recognition of lower-case letters.
5. Numbers - quantitative concepts, number recognition.
6. Copying - visual-motor integration.
7. Total Score.

Metropolitan Readiness Test, Level II, 1976 Edition

1. Auditory - consonant sounds and sound-letter correspondence.
2. Visual - matching and finding patterns.
3. Language - grammatic structure, listening comprehension, drawing inferences.
4. Pre-Reading - areas 1, 2, and 3 combined.
5. Quantitative - concepts, counting, simple math operations, reasoning.

Across all eight studies there were 56 comparisons of academic achievement. Of these 43 percent statistically favored FDAD, 16 percent favored HDED, and 41 percent resulted in no significant difference (Table 2 - see appendix). If only Metropolitan Readiness Test results are considered, a total of 45 comparisons were made and of these 53 percent favored FDAD, 16 percent favored HDED, and 31 percent favored neither schedule. A careful examination of subtest scores indicated no one schedule to be particularly beneficial for a certain type of academic skill. For example, there was no trend for one schedule to be superior in listening skills or visual matching.

Table 3 (see appendix) presents results of comparisons on socioemotional development. In view of the trend for educational research in general to ignore these kinds of outcomes, the number and variety of socioemotional characteristics is quite high. All told, 18 socioemotional comparisons were reported and of these, 17 percent statistically favored FDAD, 11 percent favored HDED, and 72 percent of the comparisons indicated no significant differences.

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*Determining the number of comparisons was not always cut and dried. For example, several studies compared HDED with FDAD for boys, then girls, and then boys and girls combined. There were also cases where comparisons were made for separate buildings and then all buildings combined. A rule was established to use the most inclusive comparison yielding the fewest number of comparisons.

Several authors investigated the possibility that one schedule is more effective with boys or girls than the other schedule. The best procedure to explore this possibility is to test for a significant interaction between type of schedule and sex. If the interaction is significant, then there is evidence that members of one sex perform reliably better in one schedule than the other. Results on interactions were available from the Cleminshaw and Wenger research. Between these two studies, interactions were tested for eleven academic measures and three socioemotional measures. None was statistically significant indicating that neither HDED nor FDAD was particularly beneficial for boys versus girls.

PART 2: HALF-DAY, EVERYDAY (HDED) VERSUS FULL DAY, EVERYDAY (FDED)

Eight studies were located which directly compared children in HDED with children in FDED. Unlike the students in Part 1, these students came from urban and suburban areas, as well as rural areas, and they varied more in geographical location, race, and socioeconomic status (Table 4 - see appendix). The FDED kindergarteners typically met six hours a day, five days a week. For all but two studies (Humphrey 1 and 2), the FDED was used for the full school year. Testing was done at the end of kindergarten for all studies except Humphrey 2, which conducted follow-up testing at the end of first grade.

As in Part 1, the comparison approach was used to summarize the research. Table 5 (see appendix) presents the results on academic achievement. Across all studies, there were 33 comparisons. Of these, 85 percent statistically favored FDED, none favored HDED, and 15 percent resulted in no significant difference. Considering only comparisons with the Metropolitan Readiness Test, there were 13 comparisons; the percentage favoring each schedule was the same as when considering all tests.

Only one study tested for differences in socioemotional development. Hatcher used the California Test of Personality at the end of kindergarten and found no significant difference between HDED and FDED on total adjustment. The Humphrey 3 research compared children's attendance at the beginning, middle, and end of kindergarten and found no significant differences between the two schedules.

Two authors explored the possibility that FDED was particularly effective for certain types of students. Ziomeck looked at children's race and sex and whether they did or did not have preschool experience. In all cases for both years, no significant interactions were found. That is, the FDED was equally beneficial for boys and girls, children of majority and minority race, and children with and without preschool experience. Lysiak considered whether children were enrolled in middle or upper socioeconomic school buildings and did find a significant interaction. HDED and FDED children from middle class buildings performed about equally well on the Metropolitan Reading Test, but FDED children from upper class buildings performed reliably higher than HDED children from upper class buildings.

IMPLICATIONS

Before attempting to draw conclusions, it would be well to note the limitations of this review. Ideal research designs are difficult to achieve, particularly when studies are conducted in actual teaching situations. As a group, there were two general problems--selection of children and classrooms and systematic control of teacher and curriculum characteristics. Further research to correct these problems would be very useful. No research was located in which all three schedules were directly compared. More research is also needed to investigate which kinds of students do best in certain types of schedules.

In the meantime, many parents, educators, and school boards are facing decisions on kindergarten scheduling. Each of the studies cited in this review exhibit enough research control to warrant judicious consideration when the results are interpreted as a whole. If this body of research is ignored, then the basis for decision making must revert to finances, personal experience, and speculation.

For the half-day, everyday versus full day, alternate day research, the implications depend on the type of question asked. If the question is, "Is one schedule better than another?", the answer is not clear cut. In the academic area the full day, alternate day schedule held a small edge over the half-day, everyday schedule, but there was no pattern for full day, alternate day to consistently favor certain kinds of academic skills. It is not appropriate to conclude that implementing full day, alternate day will ensure superior achievement. In the socioemotional area, scheduling had very little effect. Another, perhaps more relevant, question is, "Will changing from half-day, everyday to full day, alternate day have detrimental effects on the children?" The implications are more direct in this case. In spite of opinions that a full day is too long for five-year olds and kindergarteners need daily school contact, the evidence clearly indicates that full day, alternate day does not result in reduced achievement or socioemotional adjustment.

For the half-day, everyday versus full day, everyday research, too little has been done to draw conclusions about socioemotional development. In the academic area stronger implications can be stated. A large majority (85 percent) of all comparisons found that children in full day, everyday kindergarten performed significantly higher in achievement than children in the half-day schedule. In no instance was half-day, everyday significantly higher than full day, everyday. This conclusion on statistical superiority raises an important question--"How much better do children in the full day, everyday schedule perform?" A direct answer is not possible. Two studies used tests which provide grade equivalent scores. Many test experts advise against the use of grade equivalents, because they are easily misinterpreted for individual students. This caution can be relaxed somewhat here, because the following grade equivalents are averages across a large number of students. A more serious caution is that these grade equivalents come from only two studies. They are not representative of the research as a whole. They are presented only to give a rough indication of the degree of achievement differences observed in several isolated programs. In the chart below, grade level precedes the decimal point, and the month follows the decimal point (2.5 is fifth month of second grade; K.6 is sixth month of kindergarten):

Major Author	Subject Area	FDED	HDED
Humphrey 2--Gates-MacGinite Test given at end of first grade (1.7)	Reading Vocabulary	2.5	1.7
	Reading Comprehension	1.8	1.7
	Total Reading	2.2	1.7
Adcock--Metropolitan Achievement Test given at end of Kindergarten (about K.8)	Reading	1.1	K.6
	Mathematics	1.1	K.4
	Language	K.9	K.6
	Total Test	1.0	K.6

The Adcock results indicate that the average half-day, everyday child was several months below actual grade placement, while the average full day, everyday child was several months above grade placement. Humphrey's findings are particularly interesting. The full day, everyday group attended half days during the first semester and full days only during the second semester. In spite of this, the average full day, everyday child was considerably above grade placement in vocabulary and total reading, a full year later. Keeping in mind that these scores are from only two programs, there is evidence that the full day, everyday schedule can have educationally as well as statistically significant effects on achievement.

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TABLE 1

BACKGROUND INFORMATION FOR STUDIES COMPARING
FULL DAY, ALTERNATE DAY WITH HALF DAY, EVERY DAY KINDERGARTEN SCHEDULES

MAJOR AUTHOR	DATE	LOCATION	DISTRICT INFORMATION	TOTAL NO. OF CHILDREN
Minnesota Department of Education	'71-'72	Minnesota	Six rural districts near Twin Cities	96 selected from ten classes
D. Gornowich	'71-'74	Northern Minnesota	Grand Rapids Public Schools district described as rural	787 from eight buildings
H. Cleminshaw	'76-'77	Northern Ohio	Four rural/suburban, lower middle-class districts	96 from four classes
E. Wenger	'76-'77	Southern Ohio	Four rural districts	223 from four buildings
R. Smith	'77-'78	Ohio	Eight geographically dispersed districts	201 selected from 29 classes
C. Smith	'74-'75	Northern Minnesota	Two rural districts: Grand Rapids Public Schools and Coleraine Public Schools	257 from six buildings
C. Smith	three-year follow-up of C. Smith; Fall, 1978	Northern Minnesota	Two rural districts: Grand Rapids Public Schools and Coleraine Public Schools	86 fourth graders from four classes
G. Ulrey	2nd semester in late '70's	Colorado	Two rural, middle-class districts	115

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TABLE 2

SUMMARY OF RESULTS COMPARING FULL DAY, ALTERNATE DAY (FDAD)
WITH HALF DAY, EVERY DAY (HDED) KINDERGARTEN SCHEDULES

Academic Achievement

Major Author of Study	Instrument Used for Comparison	Number of Comparisons			
		Total	Favoring* FDAD	Favoring* HDED	Favoring* Neither
Minn. Dept. of Educ.	Caldwell Preschool Inventory; Four locally constructed tests (naming lower case letters, capital letters, numbers; identifying letter sounds)	5	0	2	3
G. Ulrey	California Achievement Test (total pre-reading score)	1	0	0	1
C. Smith (follow-up)	Iowa Tests of Basic Skills	5	0	0	5
C. Smith (short-term)	Metropolitan Readiness Tests (1976 Edition)	5	3	0	2
E. Wenger	Metropolitan Readiness Tests (1976 Edition)	5	0	3	2
R. Smith	Metropolitan Readiness Tests (1965 Edition)	7	0	3	4
D. Gornowich	Metropolitan Readiness Tests (1965 Edition)	21	15	1	5
H. Cleminshaw	Metropolitan Readiness Tests (1965 Edition)	7	6	0	1
TOTAL		56	24	9	23
(percentage of comparisons)		(100%)	(43%)	(16%)	(41%)

*A comparison was considered to favor one schedule over the other, if the average outcome in one schedule was reliably higher than the average outcome in the other schedule. In statistical terms, there was a significant difference at or below the .05 level. A comparison was considered to favor neither schedule if the difference was not statistically significant.

TABLE 3

SUMMARY OF RESULTS COMPARING FULL DAY, ALTERNATE DAY (FDAD) WITH HALF DAY, EVERY DAY (HDED) KINDERGARTEN SCHEDULES

Socioemotional Development

Major Author of Study	Instrument Used for Comparison	Number of Comparisons: Total	Favoring* FDAD	Favoring* HDED	Favoring* Neither
G. Ulrey	Connor's Hyperactivity Scale	1	0	1	0
H. Cleminshaw	Animal Crackers (achievement motivation); Kohn Social Competency Scale (two rating scales: participation vs apathy and cooperation vs defiance)	3	1	0	2
R. Smith	Sentiment toward school and two measures of isolation from a sociogram	3	0	0	3
C. Smith (short-term)	Self Observation Scale (self-acceptance, social maturity, school affiliation, self-security)	4	2	1	1
C. Smith (follow-up)	Self Observation Scale (the above measures plus social confidence, teacher affiliation, and peer affiliation)	7	0	0	7
TOTAL		18	3	2	13
(percentage of comparisons)		(100%)	(17%)	(11%)	(72%)

*A comparison was considered to favor one schedule over the other, if the average outcome in one schedule was reliably higher than the average outcome in the other schedule. In statistical terms, there was a significant difference at or below the .05 level. A comparison was considered to favor neither schedule if the difference was not statistically significant.

TABLE 4

BACKGROUND INFORMATION FOR STUDIES COMPARING
FULL DAY, EVERY DAY WITH HALF DAY, EVERY DAY KINDERGARTEN SCHEDULES

MAJOR AUTHOR	DATE	LOCATION	DISTRICT INFORMATION	TOTAL NO. OF CHILDREN
Ziomeck 1	1979-80	Central Iowa	Des Moines Independent School District	490 in 23 classes in 13 buildings*
Ziomeck 2	1980-81	Central Iowa	Des Moines Independent School District	457 in 23 classes in 13 buildings*
Humphrey 1	2nd semester of 1978-79	Southwest Indiana	Evansville-Vanderburgh School Corporation, urban, suburban	396 in eight buildings
Humphrey 2	one-year follow-up of Humphrey 1; April, 1980	Southwest Indiana	Evansville-Vanderburgh School Corporation, urban, suburban	244 in eight buildings
Humphrey 3	1979-80	Southwest Indiana	Evansville-Vanderburgh School Corporation, urban, suburban	428 in eight buildings
Lysiak	1974-75	Northeast Texas	Ft. Worth Independent School District	532 from middle and upper class buildings
Adcock	1978-79	Maryland	Five rural school districts	155
Hatcher	1977-78	Texas	Four rural school districts	110 from 26 classes about half Anglo and half Mexican-American

*Approximately 40 percent of the children were of minority race.

TABLE 5

SUMMARY OF RESULTS COMPARING FULL DAY, EVERY DAY (FDED) WITH HALF DAY, EVERY DAY (HDED) KINDERGARTEN SCHEDULES

Academic Achievement

Major Author of Study	Instrument Used for Comparison	Number of Comparisons: Total	Favoring* FDED	Favoring* HDED	Favoring* Neither
Ziomeck 1	Metropolitan Readiness Test (1976 Edition); local criterion-referenced math test	6	6	0	0
Ziomeck 2	Metropolitan Readiness Test (1976 Edition)	5	5	0	0
Humphrey 1	California Achievement Test	7	6	0	1
Humphrey 2	Gates MacGinitie Reading Tests	2	2	0	0
Humphrey 3	California Achievement Test	7	5	0	2
Lysiak	Metropolitan Readiness Test (1965 Edition)	1	0	0	1
Adcock	Metropolitan Achievement Test	4	4	0	0
Hatcher	Metropolitan Readiness Test, Level I (1976 Edition)	1	0	0	1
TOTAL		33	28	0	5
(percentage of comparisons)		(100%)	(85%)	(0%)	(15%)

*A comparison was considered to favor one schedule over the other, if the average outcome in one schedule was reliably higher than the average outcome in the other schedule. In statistical terms, there was a significant difference at or below the .05 level. A comparison was considered to favor neither schedule if the difference was not statistically significant.

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